

57042-050(GBTI91US)

IMPLEMENTATION OF DIGITAL FILTER WITH  
REDUCED HARDWARE

**Abstract of the Disclosure**

A digital filter function requires many coefficient multiplications. Instead of implementing the multiplications individually as multipliers, the inventive filter implements them using traverse or shift operations. This approach uses the relation among the coefficients of the digital filter to reduce the required hardware. Hence, a digital filter in  
5 accord with the invention uses scalers and sample combiners for processing samples of a digital input stream, without the need for numeric multiplication. Each scaler scales a respective input sample from one of the combiners, preferably by a different power of 2. The combining circuits combine sets of samples, from the digital input stream and from the digital output of the filter, to form the input samples for processing by the scalers. An adder totals  
10 the respective scaled values, to form the digital output stream of the filter. The digital filter may be used in a variety of digital signal processing applications, but the filter is particularly useful in a low-power portable device, such as a wireless spread-spectrum receiver.